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How do parents perceive and utilize knowledge of their infant's mental health? A systematic review

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Abstract:	<p>Infant mental health is a growing area of practice for health, education and social care practitioners, as links are increasingly made between experiences in the early years and subsequent child development, mental health and wellbeing. It is unclear how parents perceive infant mental health and use knowledge relating to infant mental health with their children. We conducted a systematic review, the aim of which, was to determine parents' perceptions of infant mental health and how they utilize this knowledge with their infants. We undertook a search of relevant databases and journals and from an initial list of 4147 potential papers, identified 16 for the review. Original data were extracted and presented in a table, and the content of all papers was analyzed thematically and presented in narrative form. Three main themes emerged from the available research: knowledge and understanding of child development; influences of society and culture; interpretation of emotions and expressions. Our results indicate that research is limited in terms of parental perspectives of infant mental health and how they obtain and use this knowledge. Further research is needed to investigate this topic to maximize mental well-being in infancy and later life.</p>

Introduction

Promoting the development of good mental health in utero and infancy is one of the key components for wellbeing throughout life (Public Health England, 2016) (PHE). Infancy is a critical period of neurological development (Sanes and Jessell, 2013), as early experiences during childhood have been shown to have an impact upon brain development (Sheridan and Nelson, 2009). The environment in which children live affects their biological development, through a process called ‘biological embedding,’ which leads to neural development and neural sculpting (Irwin et al., 2007:21). Although the brain continues to develop throughout the life course, the neurological development that takes place within the prenatal period and first three years of life provides a foundation that influences our emotional, perceptual and cognitive abilities, and subsequently our learning as we progress through life (Fox et al., 2010).

Infant mental health (IMH) is defined as ‘the ability of infants to develop physically, cognitively, and socially in a manner which allows them to master primary emotional tasks of early childhood without serious disruption caused by harmful life events. Because infant growth is maximized in a nurturing environment, infant mental health involves the psychological balance of the infant-family system,’ (Fitzgerald and Barton, 2000: 2828).

The environmental factors that influence a child’s development and subsequently their mental health are multiple and complex, extending from the individual child to the global context (Irwin et al., 2007). The focus on how early experiences influence the developing brain has led to the promotion of infant emotional and social development through early interventions aimed at children aged between 0-3 years (Allen, 2011). Early interventions focus on parenting as the source of infant brain development, the emphasis usually upon the action of parents, particularly the mother (Lowe et al., 2015). Parenting practices and understanding of

child development are shaped by the culture of communities, for example the activities, practices, beliefs and ecology of the settings, in which children and their carers live (Weisner, 1996). However, central to infant mental health, is the infant's subjective experience of the world, and this initially takes the form of relationships with care givers (Zeanah and Zeanah, 2009). Quality of the infant –parent relationship may impact the development of adult psychiatric disorders; particularly when the relationships are neglectful and intrusive (Fryers and Brugha, 2013).

Encouraging parents to create an environment to maximize infant mental health, is a key task for health and social care professionals (PHE, 2016; Department Health and NHS England, 2015). Yet little is established regarding parents knowledge of their infant's mental health. Therefore, the aim of this systematic review was to explore how parents perceive and utilize knowledge of their infant's mental health, with a view to informing professionals of the best way to support them. The objectives were to, 1. Identify what infant mental health means to parents, 2. Consider how parents gather knowledge of infant mental health, 3. Explore how parents use their knowledge of infant mental health, 4. Consider how health and social care professionals can utilize the current evidence to promote infant mental health with parents.

Methods

A systematic review can be used to identify and evaluate the current evidence on a topic, and is used frequently in a healthcare context as a foundation for recommendations and policies (Centre for Reviews and Dissemination, 2009) (CRD). Using guidance provided by the CRD (2009), a search of the literature was undertaken using both electronic and manual methods to find empirical studies in peer reviewed English language journals published between end of

January 1992 and December 2017. The search strategy outlined in Table 1 identifies the descriptors used to identify population groups, and terms to establish parental perception and knowledge. As an extensive amount of brain development takes place in the prenatal period up until the age of 2, the search focused on infants aged 0-2 years (Fox et al., 2010; Knickmeyer et al., 2008).

Table 1. Search strategy.

Figure 1 outlines the study selection process. All authors were involved in the selection process, with any differences of opinion resolved through group discussion. A total of 103 papers were read, 56 papers were excluded: the child’s age did not meet the inclusion criteria in 18 papers; in 37 papers the research question was not addressed and one paper was not retrievable. A further 47 papers were appraised for quality, using the ‘QualSyst’ tool (Kmet et al., 2004), which allows the appraisal of both qualitative and quantitative research using a list of criteria (such as sample size, use of blinding, appropriateness of analytical method) to address the quality of each (Kmet et al., 2004). Two researchers assessed papers independently and any disagreements were discussed until a consensus was reached. We included papers of a high methodological quality only (scoring 80% or more); subsequently 16 papers were included in the review. Risk of bias was addressed through robust definition of eligibility criteria, independent selection of studies for inclusion, involvement of several authors, using a recognised tool for quality appraisal of the research, and appropriate methods for synthesis of findings (Whiting e al., 2016).

Figure 2. Selection strategy

Data abstraction

Characteristics of individual studies were abstracted according to the four research objectives, with groupings and clusters of study characteristics, such as methodology and focus of study (Table ST1). Due to heterogeneity of the methods, samples and outcome measures, neither meta-analysis nor meta-synthesis was possible. Data from the studies were synthesised using thematic analysis, which involves identifying key and repeated findings from the studies and arranging them under thematic headings, (Dixon-Woods et al., 2004). The results are presented in narrative form.

Results

The study selection and quality appraisal process outlined above yielded 16 papers. Of the sixteen studies, nine were conducted in the United States (US), two in Italy, one in the United Kingdom (UK), one in Australia, one in Germany, one in Switzerland, and one in Korea. Four studies were undertaken using qualitative methods (Dallas et al., 2000; Degotardi et al., 2008; Kurth et al., 2014; Moscardino et al., 2006). The remaining twelve studies were undertaken using quantitative methods. Of these, eight studies were based on a cross sectional approach (Bornstein et al., 2001; Hane et al., 2006; Harwood, 1992; Harwood et al., 1996; Keller et al., 2003; Seo, 2006; Stoiber and Houghton, 1993; Turner et al., 2008) and four were longitudinal studies (Donovan et al., 2007; Huang et al., 2005; Jessee et al., 2016; Miller and Harwood, 2002). Inferential statistics were used to analyse data in all the quantitative studies. Cohort sizes ranged from 7 to 1114 participants.

It is noteworthy that it was not possible to answer in full the research objectives due to limited research in this area. We found that the research almost exclusively focused on mothers alone, apart from one set of authors who reported findings related to both parents (Dallas et al., 2000). All studies included data on participants' perceptions of infant mental

health, and how they might gather knowledge of this. In nine studies, authors reported how participants used knowledge relating to their infant’s mental health (Bornstein et al., 2001; Dallas et al., 2000;; Donovan et al., 2007; Huang et al., 2005; Keller et al., 2003; Kurth et al., 2014; Miller and Harwood, 2002; Moscardino et al., 2006; Seo, 2006). The themes identified from the literature are (1) knowledge and understanding of child development; (2) influences of society and culture; and (3) interpretation of infant emotions and expressions.

Knowledge and understanding of child development

The research within this theme focussed primarily upon measuring maternal knowledge of child development and the relationship of this to child development outcomes and parenting behaviour. Specific groups, related to ethnicity, socio economic status and age are the focus for the research, including teen parents (Dallas et al., 2000; Stoiber and Houghton, 1993), Korean working mothers living in poverty (Seo, 2006), and differing ethnic and demographic groups from within the U.S who were part of an intervention called Healthy Steps, (Huang et al., 2005). The research methods for the studies drew upon an imposed etic approach (Berry, 1969) all relying upon testing parental knowledge and behaviours using measuring tools that are not culturally specific or sensitive. There are some universals in child development between cultures, usually defined in Western terms as age specific developmental milestones (e.g. social smiling), but there are differences structured by cultural environments and the expectations and experience of infant carers’ in relationship to their development (Super and Harkness, 1986; Super and Harkness, 2010).

Seo (2006) and Stoiber and Houghton (1993), demonstrated that higher levels of maternal knowledge relating to child development resulted in children with better developmental outcomes and more positive parenting behaviours. However, the impact of maternal

knowledge of child development on parenting behaviours may be situation specific. Huang et al. (2005) reported that knowledge of child development only influenced parenting behaviours when engaged in a teaching task, with lower levels of knowledge associated with a less sensitive interaction during the task. This may not be the same for all ethnicities and social groups: for example, White American mothers' greater knowledge of child development was associated with better interaction during a teaching task; this was not the case for Hispanic and African-American mothers (Huang et al., 2005). Whereas lower levels of child development knowledge in Hispanic mothers was positively associated with a quality home environment and better interaction with their child during play (Huang et al., 2005). Maternal perceptions that were mature, positive, and realistic about child behaviour resulted in children with better coping strategies (Stoiber and Houghton, 1993), whilst providing a more stimulating home environment was linked to increased knowledge of child development (Seo, 2006). The participants in the study by Dallas et al. (2000) reported gathering their knowledge of child development from family and neighbour's recollections of themselves as children, emphasising how child development is influenced by social networks (Lewis, 2005). However, for the purposes of the research, an expert text by Green et al., 1994, cited by Dallas et al., 2000, decided normal variations in child development. In using this approach, Dallas et al. (2000) found that teen mothers and fathers had unrealistic expectations of child developmental milestones.

Influences of society and culture

The literature depicts what infant mental health means to parents through the study of social and cultural factors; measuring how parents, mostly mothers, view child behaviours, the parenting practices they use to promote specific child behaviours, and how they perceive their parenting. Examining child development from a cultural perspective involves considering

children and their parents as part of a community and the practices of every-day life (Rogoff, 2003; Weisner, 2002). The focus is upon comparing the beliefs and practice from mothers of differing ethnicities, socio economic groups, immigration status and regional areas. Bornstein et al. (2001), Miller and Harwood (2002) and Moscardino et al. (2006) focus upon maternal beliefs and parenting practice in terms of the infant behaviour encouraged; showing how parents gather knowledge and use their knowledge of infant mental health, whilst Harwood (1992) and Harwood et al., (1996) consider maternal beliefs relating to desirable and undesirable child behaviors.

Studying child development within a cultural context usually involves one of three methodological approaches (Super and Harkness, 2010). Ethnographic, used by Moscardino et al. (2006); social address, comparing groups from two or more cultures, as used by Harwood (1992) and Harwood et al. (1996) and unidimensional, comparing two contrasting societies, used by Bornstein et al. (2001) and Miller and Harwood (2002).

Cultural background influenced maternal perceptions of desirable child behaviour. For example, Anglo-American mothers valued behaviours that demonstrated toddler independence, and scope for personal development, whilst Puerto-Rican mothers viewed interdependence and ability to maintain respectful behaviours in public as important (Harwood, 1992; Harwood et al., 1996; Miller and Harwood, 2002). Maternal parenting practices demonstrate some differences that appear to encourage these behaviours. For example, Anglo-American mothers encouraged self-feeding at the ages of 8 and 12 months, and engaged in social play that encouraged infant choice and movement. Puerto-Rican mothers were more likely to spoon feed their infants at 12 months, and encourage quieter more interactive social play (Miller and Harwood, 2002). The research does not describe contextual factors such as the environment, which influence choice of parenting behaviours, a

criticism of both the social address and unidimensional approaches (Super and Harkness, 2010).

Moscardino et al. (2006) found that child behaviours reflecting autonomy, respect and a calm personality were viewed as significant by first generation Nigerian immigrant mothers living in Italy. These mothers promoted autonomy by helping their infants to develop their motor skills through games and use of massage. They also believed that close physical contact with their infant was required for infant health, reporting parenting behaviours to promote this, including co-sleeping, infant massage and breast-feeding (Moscardino et al., 2006).

However, the mothers used Italian medical services for their child and expressed the desire for their babies to understand the systems of their new country (Moscardino et al., 2006).

This suggests an ecocultural approach to child development, as these mothers recognised the need to adapt their parenting behaviours to encourage their children to adopt activities that would help them thrive in their environment (Weisner, 2002). Some authors attempted cross-cultural studies. The consideration of parenting behaviour by applying frameworks for comparison is problematic, as each society will place a different meaning on their behaviour (Berry, 1969). Some researchers attempted to overcome this, for example Harwood (1992) demonstrated that maternal perspective of what is desirable and undesirable attachment behaviour as framed by the Strange Situation experiment differs dependent on Puerto Rican or Anglo origin. This is achieved by using a derived etic approach, meaning that frameworks for studying beliefs are created using an insider emic approach (Berry, 1969). The derived etic approach allows the identification of cultural patterns, the identification of which may then become an imposed etic approach (Rogoff, 2003).

Interpretation of infant emotions and expressions

Central to human development is emotional growth, depending upon the reciprocal interpretation of cues between primary caregiver and infant (Bornstein et al., 2012). In determining how parents gather and use knowledge of their infants mental health we found that researchers focused on how the dyadic relationship between primary caregiver (usually the mother) and infant shapes the regulation of one’s own emotions and subsequent social relationships with others (Lewis, 2005). The papers included in this theme largely focussed upon the ability of mothers to interpret infant emotions and expressions, measured by knowledge of child development and maternal beliefs, reflecting the importance given to the dyadic relationship in research. The research largely disregards how exposure to fathers, other care -givers, community and social networks will influence the care infants receive, and the significance placed on infant emotions and expressions (Lewis, 2005; Weisner, 2002).

Turner et al. (2008) assessed the link between the mentalisation and executive functioning abilities of mothers, their capacity to recognise signals of infant emotion and self-reported perception of the bonding relationship with their baby. Testing of maternal abilities and perspectives occurred using a series of assessment tasks, which apart from the appraisal of the bonding relationship did not include reference to their own baby. For example, maternal ability to assess signals of infant emotion was undertaken using a collection of photographs of infant facial expressions, called the ‘infant facial expressions of emotions from looking at pictures’ (Emde, et al., 1987, cited by Turner et al. 2008: 502). Use of this type of assessment tool to assess emotional expressions is questionable, when evidence suggests that infants engage with their caregivers in mutually coordinated interactions to create shared meanings (Tronick and Beeghly, 2011). In fact another paper in this section highlights that maternal

perceptions of infant emotions may be context dependent. With mothers agreeing with observer ratings of infants that display high amounts of negativity during home based activities, and agreeing with observer ratings of infant positivity when they experienced low positivity in affect when playing with their infant (Hane et al. 2006). This study was conducted in home as well as laboratory settings, which may add to the validity of the findings, as laboratory are not usual environments for mothers and their babies. The research by Turner et al. (2008) did not support a link between executive functioning and bonding relationship with maternal ability to recognise emotional cues from infant facial expressions. A strong positive association did emerge between maternal ability to identify mental states and interpret infant facial expressions, indicating a link between maternal ability to recognise infant emotions and mentalisation.

Donovan et al. (2007) use laboratory research to explore if maternal self-efficacy mediated by knowledge of child development anticipated behavioural sensitivity of a mother when feeding her child. The suggestion was that maternal sensory sensitivity, operationalised by maternal ability to determine digital impressions of unrelated infant expressions would mediate the relationship. Similar to the research by Turner et al.(2008) the focus is not upon the mother and child or family relationship but upon one individual in the relationship (namely the mother), therefore ignoring the interactive nature of the relationship and predetermining the type of behaviour expected from the individual (Burman, 2017). Mothers undertook a mixture of questionnaires, and child-care tasks and a relationship was revealed between the ability to interpret positive and negative infant facial expressions to maternal self-efficacy, with high self-efficacy resulting in greater behavioural sensitivity and more positive emotional responses than low/moderate self-efficacy. The operationalisation of self-efficacy was organised using a measure of illusory control, with high illusory control

determined as low self-efficacy, moderate illusory control as high self-efficacy and low illusory control as moderate self-efficacy. Knowledge of child development was a mediating factor with those mothers having moderate self-efficacy and low knowledge of child development demonstrating less sensitive behaviour than mothers with high self-efficacy. Maternal high self-efficacy and high knowledge of child development were associated with greatest sensory sensitivity to infant facial expressions, whilst mothers with the low self-efficacy and moderate to high knowledge levels were the least sensitive (Donovan et al., 2007). Measurement of maternal behavioural sensitivity was undertaken using a scale devised by Ainsworth et al. (1974, cited by Donovan et al., 2007). Keller et al. (2003) also used this scale to observe the interaction between three parenting behaviours of warmth, contingency and sensitivity in response to infant communications and maternal attitudes towards their infants. Whilst Donovan et al. (2007) and Keller et al. (2003) made adjustments to the scale to conform with their research, the identification of parenting behaviours are problematic as constructs such as sensitivity are culturally situated and determined by individual interpretations of behaviour between mother and infant (Burman, 2017). The expectation by Keller et al. (2003) was that a cultural commonality exists between the three parenting behaviours of warmth, contingency and sensitivity demonstrated by maternal attitudes in their views of these behaviours and their infants. The sample was homogenous in terms of nationality, ethnicity, socio-economic status and contained mothers with first-born children only. However, the choice of research instruments reflected an imposed understanding of the variables under study, and these were not sufficiently adapted to meet the understanding that research participants may have of the experience (Rogoff, 2003). The subsequent results of the study were unexpected in that observations of maternal sensitivity were significantly associated with maternal attitudes towards contingency, rather

than, for example, observations of maternal warmth being associated with maternal sensitivity.

Jessee et al (2016: 70) assessed the supportive parenting behaviours of 1114 mothers, when their child was aged 24 months, using measures of 'sensitivity to non-distress,' 'stimulation to cognitive development,' and 'positive regard for the child.' Development of the scale to measure supportive behaviour took place in an earlier study involving the same sample, there is limited explanation regarding how the content of the measures was decided (National Institute of Child Health and Human Development, 1999). Arguably, these measures reflect an idealised version of maternal behaviour, and are assumptions of what constitutes supportive parenting behaviours. The behaviours were assessed alongside maternal ability to engage in cognitive mental state talk and emotional/desire state talk, measured using coding practices identified by the authors from related literature. The research demonstrates that maternal actions of supportive behaviour, cognitive mental state talk and emotional/desire state talk are separate features of maternal parenting behaviour. The longitudinal nature of the research allowed for comparison of maternal parenting behaviours alongside maternal depressive symptoms assessed at 1 and 6 months postnatal, infant temperament assessed at 6 months postnatal, and beliefs regarding parenting assessed when the infant was 1 month of age. Depressive symptoms at 1 and 6 months postnatal were associated with less supportive parenting behaviour at 24 months, whilst progressive rather than traditional parenting beliefs were associated with higher levels of supportive behaviour, cognitive mental state talk and emotional/desire state talk. Mothers from higher socio-economic groups and whose children were European-American demonstrated more supportive behaviour and cognitive talk, suggesting that the constructs used to form the measures, reflect the consequence of

psychology undertaking research using mainly ‘Western, Educated, Industrialized, Rich and Democratic (WEIRD) societies’ Henrich et al., 2010: 61).

Kurth et al. (2014) use interpretive phenomenology to analyse maternal experiences of infant crying and Degotardi et al. (2008) use grounded theory to develop a conceptual framework of mothers’ beliefs about their infant’s minds. The methods move from an emic to a derived etic approach, using maternal experiences to understand the phenomenon and progressing to researcher interpretation based on participant experiences (Rogoff, 2003). Authors of neither papers report the use of respondent validation and therefore it is difficult to ascertain if the subsequent researcher analysis would be recognizable to participants (Bryman, 2012). Experience helps mothers to manage infant crying, in terms of recognising the severity of the cry, having the confidence to manage infant crying and manage their own reactions to crying (Kurth et al., 2014). Mothers attribute psychological states to their infants, which the child may realise, giving some indication as to how children come to be able to interpret their own behaviour and that of others (Degotardi et al., 2008). Two categories of infant behaviour were identified from interviews with mothers of infants aged 12-24 months, non-psychological, and psychological. Whilst mothers viewed the infant as the passive recipient of psychological experience, they also interpreted their infant behaviour as constructing psychological meaning to external events, using this knowledge to communicate. Mothers acknowledged the ability of infants to be individual in their expressions, having the ability to express what they want to achieve (Degotardi et al., 2008).

Discussion

Despite some interesting themes emerging from the literature regarding parental, particularly maternal perceptions and knowledge of infant mental health, it is difficult to fully answer the

first three objectives of the systematic review for three reasons. Firstly, the use of definitions to operationalise the concept of infant mental health, secondly, the dominance of developmental psychology in this field and lastly, the positioning of mothers as research subjects.

Adopted by the World Association of Infant Mental Health (2018), the definition used to generate search terms for this review is perhaps more recognisable to educational and research professionals than parents. The majority of the research presented originates from developmental psychology, where decisions on units of measurement and how to measure them during the research process, represent wider beliefs about the place that mothers and children hold in society (Burman, 2017). The focus on the dyadic relationship and the behaviour of just one participant, usually the mother, lacks consideration of the structural factors that influence how the infant is cared for (Burman, 2017). Therefore the instruments used to measure maternal behaviours in most of the research presented here, is detached from the reality and complexity of participants every-day lives. The emphasis on the dyad and the theory of monotropy suggests that the attachment relationship dominates the focus of research included in this review. Subsequently ignoring environmental considerations, failing to capture the intricacy of the infant's social world, and the influence these factors have upon decisions related to child rearing (Keller, 2017; Weisner, 2005). Whereas child development theories and concepts emphasise the importance of the cultural environment (Weisner, 2002; Super & Harkness, 1986). Reflected in the systematic review, is the detail that mothers rather than their children have become the focus of research by developmental psychology (Burman, 2017). Discounting the active role that infants have in relationships with multiple caregivers, and the individualised nature of their interactions (Tronick and Beeghly, 2011). Whilst emphasising the gendered socialisation of parenting as something that

only women can do (Hays, 1996). The criteria used to measure behaviours and abilities reflecting desired parenting characteristics, and a paternalistic approach to research. Mothers are very much the subjects of research, rather than active participants.

Conclusions and recommendations

The evidence presented in this paper will help health and social professionals to develop a research informed awareness of infant mental health. In working closely with parents, they may recognise and address the roles that cultural values play in parenting research. The subject of infant mental health is value- laden and practitioners and researchers reflect and inform these values. Drawing upon critical theory or constructivism would help to explore this, better incorporating researcher reflexivity into primary studies of parental influence and knowledge about infant mental health (Guba & Lincoln, 2008). Pivotal to infant care and development is the cultural context in which the infant lives (Rogoff, 2003). The realities of caring for infants in differing contexts requires further recognition, and development of emic approaches, such as research using an ethnographic design that is ecologically positioned (Weisner, 2014). This approach will help practitioners and parents to vocalise what is intuitive and therefore obtain evidence of how they respond to and affect their infant’s mental health. Quantitative methods informed by derived etic approaches, for example in aiding the design of research measurement tools that are recognisable to participants can be useful in identifying patterns among groups of people (Rogoff, 2003). Further development of quantitative methodology that draws upon derived etic approaches would help to address some of the limitations of the research in this review.

This systematic review highlights the lack of contemporary research knowledge available regarding parental perspectives of infant mental health, and the difficulties with research in

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2
3 this area. This is surprising, given the growth of child and adolescent mental health services
4
5 and a recognition of the impact of adverse childhood experience (ACE) on mental health
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7 across the life-course. Practitioners should be familiar with the dominant research approaches
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9 used, and the ways in which these influence how mothers and their infants are involved (or
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11 not) in the research process. The review highlights the complexity of parenting behaviours
12
13 and the influence of socio-cultural values and beliefs in this regard. Concepts of health and
14
15 expectations of infant behaviour vary among family groups and individuals. To promote
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17 infant mental health, practitioner knowledge of the importance of the home and wider
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19 environmental resources available to families is a good starting point. In helping parents
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21 with their infant's mental health, practitioners need to observe the family as an ecological
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23 system, with an appreciation of the role the infant plays as part of this. Expansion of research
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25 that focuses upon the infant and family within the ecological and cultural context in which
26
27 they reside will help practitioners to do this.
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33 **Strengths and limitations of this review**

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35 Multidisciplinary evidence was gathered in a systematic way for this review and as such, the
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37 multidisciplinary nature of infant mental health was acknowledged (Fitzgerald & Barton,
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39 2000). The decision was taken to only include high quality evidence to strengthen the
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41 review and ensure that the results were robust. The result is that several papers were
42
43 excluded, including grey literature that might have contributed towards an understanding of
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45 the question in telling us about the scope and scale of research approaches. The heterogeneity
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47 of the literature included in the review has meant that only a thematic analysis of the evidence
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49 was possible.
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The intention was to explore parental perceptions and utilization of knowledge about their infants’ mental health: the dominance of the quantitative approach adopted by higher quality evidence included in this review shows that understanding of the topic is shaped by and limited to measurable aspects of parenting behaviours. As such, it is difficult to draw conclusions regarding how parents perceive and utilise knowledge of their infant’s mental health. This systematic review provides the practitioner with a critical insight into the dominant higher quality research that underpins this area, and recommends a greater use of qualitative research designs and methods to extend the nature of the debate.

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Population terms: pregnancy, infant, neonate, preschooler, toddler, child, mothers, fathers, parent
Key words: parental, maternal, paternal, attitudes, beliefs, understanding, knowledge, awareness, perceptions, interaction, relationships, behaviour, regulation, attachment, bonding, mentalisation, mind mindedness, reciprocity, mental health, attachment, attunement, development, including: social, emotional, language, neurological, motor, visual, auditory, and visual development

Inclusion criteria	Exclusion criteria	Databases searched	Journals searched
Published in English in peer review journals between January 1992 and December 2017 Research studies based on empirical data in any country Human parents (including adoptive) of any age caring for infants between 0-2 years	Focus: professionals/ breastfeeding/ postnatal depression Infants with additional needs, including: medical, educational or those considered vulnerable to harm Child in foster care	Australian Education Index ERIC British Education Index CINAHL MEDLINE PsycArticles PsycINFO Soc Index	Infant Behaviour and Development Parenting Science and Practice Child Development Infant Mental Health

Table 1. Search strategy

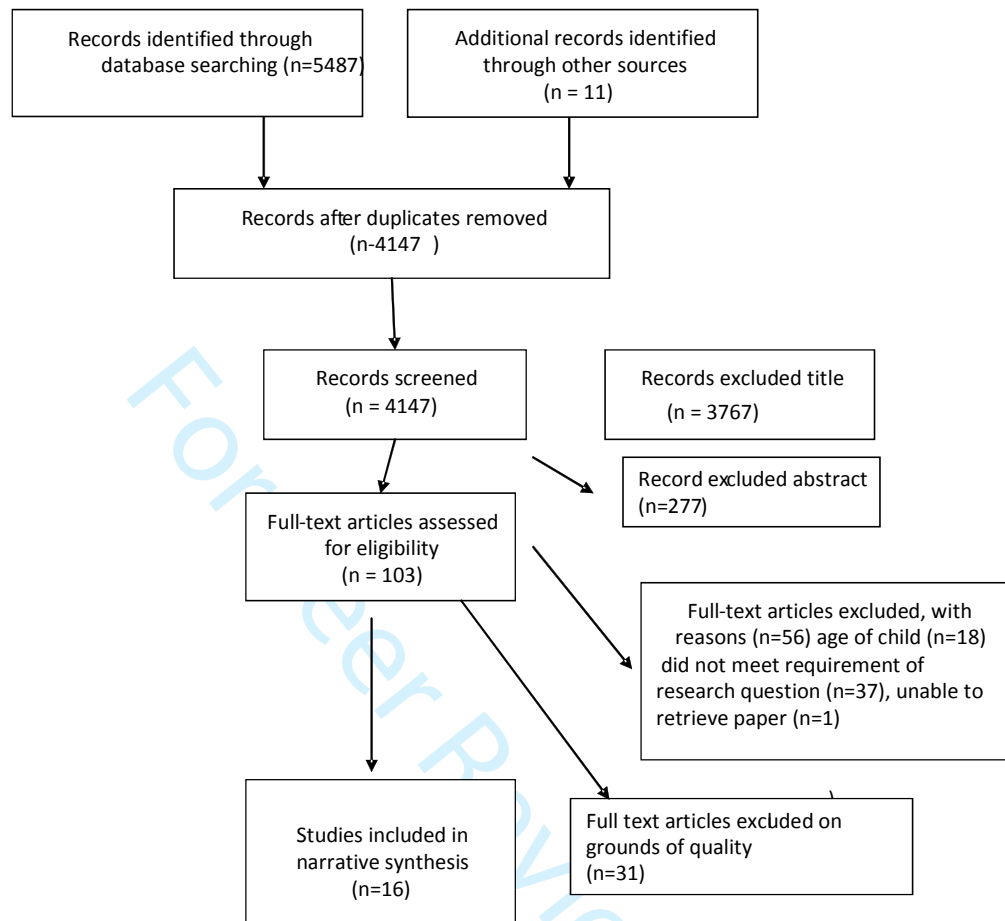


Figure 1. Selection strategy.

Author, year of publication, title and country	Aims	Methodology and data collection method	Sample and size	Method of analysis	Findings most relevant to this review	Quality including Kmet score and any limitations
BORNSTEIN et al. (2001) 'Parenting Beliefs and Behaviors in Northern and Southern Groups of Italian Mothers of Young Infants.' Italy	'To evaluate intranational variation in the ways of northern and southern Italians believe and behave in their basic infant rearing':663	Quantitative. Cross-sectional. Questionnaires. Video observation.	Mothers of 5-month-old first born infants. Northern Italy n=42, Southern Italy n=40. N=82.	Inferential statistics	Mothers living in both regions reported that they engaged in more social than didactic behaviours. Northern mothers engaged in social behaviours with infants about 50% more than Southern mothers. Mothers from both regions spent twice as much time in didactic than social behaviours with their infants.	83% Study design not explicitly stated. Further information required as to how sample recruited – appears to be volunteer. Sample size appears small, no mention of power. Some data missing.
DALLAS et al. (2000) 'Gender differences in teen parents' perceptions of parental responsibilities.' USA	'To assess the knowledge and expectations of unmarried, low-income, Mexican American and African American adolescent mothers and their male partners regarding normal child development, paternal role behaviours, and their responses to efforts to formalize specific paternal responsibilities: 423	Qualitative. Data collected using interviews from focus groups.	Five Mexican American parenting couples and two African American parenting couples. N=7 couples. African American females in last trimester of pregnancy. Mexican American couples reported having at least one infant under 2 years.	Tape based analysis. Abridged transcript and moderators' verbal summary, plus field and summary notes analysed. Provisional code list from interview guide applied to data; coded to descriptive categories. Differences in	Differences identified between the perceptions of mothers and fathers with regard to; knowledge relating to child development, use of discipline, expectations of paternal role. Both groups believe physical punishment appropriate for children, but at different ages. Fathers recognise that arguing in front of children can be damaging, identifying that the most important paternal behaviour is providing emotional support. Fathers want to engage in enjoyable in activities with their child. Mothers feel that the father's most important behaviour is to be available to the child, and that paternal activity should centre upon the traditional provider role, sharing	85% Only one session of focus group interviews provided per group. Further field work/individual interviews useful to explore the perceptions of the parents in more detail. No consideration of researcher impact.

				codes between groups considered.	in activities alongside mother and child.	
DEGOTARDI et al. (2008) 'He's got a mind of his own : the development of a framework for determining mothers' beliefs about their infant's minds.'	'To analyse the ways in which mothers talked about their infants in order to determine the kinds of statements which could be usefully be taken as belief expressions.' 'To develop a system of categorization which incorporates the full range of belief expressions in a way that would benefit current understandings of the relationships between beliefs and children's development':261	Longitudinal qualitative. Data collected when infant aged 12, 18 and 24 months. Data were collected using semi-structured interviews.	N=25 mothers with infants aged 12 months at the start of the study. Mothers recruited from Longitudinal Infancy Study of 100 families of diverse socioeconomic background.	Grounded theory.	Conceptual framework developed that demonstrates maternal beliefs about their infant's minds. Two categories generated whereby mothers describe 1. The actions of their child, so non-psychological descriptions. 2. Their child's person, the psychological view of their infant's mind. Psychological action categorised into three areas: 1. Mothers describe the child's psychological experiences (non-representational), 2. Mothers describe the child's ability to construct psychological experiences (representational), 3. Mothers describe the subjective wants of the child (representational).	85% Study design initially unclear, further information regarding sampling required. Some reflexivity demonstrated in terms of researcher's professional backgrounds but requires further development.
DONOVAN et al. (2007) 'Maternal self-efficacy, knowledge of infant development, sensory sensitivity, and maternal response during interaction.'	'To determine whether mothers varying in illusory control, potentially moderated by knowledge of infant development, showed differential sensitive responding in a feeding task, each mother with her own infant' :866	Longitudinal quantitative. Data collected when infant aged 6 and 9 months. Assessment of maternal tasks, video observation.	N=70 mothers with infant aged 6 months at start of study.	Inferential statistics.	Mothers ability to interpret positive and negative facial infant expressions related to illusory control and knowledge of infant development. Generally moderate illusory control associated with greater behavioural sensitivity and affect. Low maternal knowledge and low illusory control associated with less behavioural sensitivity. Moderate illusory control and high knowledge showed greater sensory	86% Further information regarding sample required.
Australia						
USA						

					sensitivity, compared with those with low and moderate knowledge. High illusory control and low knowledge associated with greater sensory sensitivity than if high illusory control with medium or high knowledge.	
HANE et al. (2006) 'Contextual basis of maternal perceptions of infant temperament.' USA	'To illustrate that the relations between maternal and observer based ratings of infant temperamental positivity and negativity are moderated by the infant's affective state during routine home based interactions with mother': 1079	Quantitative. Cross sectional. Data collected when infant aged 9 months. Data were collected using assessments in lab, questionnaire and video observation at home.	N=59. Mothers and infants recruited from larger longitudinal study when infant aged 4 months.	Inferential statistics.	Agreement of mother and observer ratings of infant negativity when infants demonstrated high levels of negative emotion during routine home based activities. Agreement of mother and infant positivity when low mutual positive emotion between infant and mother during play.	81% Further information required regarding sampling strategy.
HARWOOD (1992) 'The influence of culturally derived values on Anglo and Puerto Rican mothers' perceptions of attachment behavior.' USA	'To examine the influence of cultural values on mothers' perceptions of attachment behaviour': 823 A two part study: Part 1: 'indigenous concepts of desirable versus undesirable toddler behaviour were elicited using open-ended probes. Part 2: 'built on study 1 in that mothers' perceptions of Strange Situation	Quantitative. Part 1: cross sectional. Data collected using structured interview and maternal assessments. Part 2: cross sectional. Data collected using structured interview and maternal assessments. Questions/assessments based upon data gathered from part 1.	Part 1: N=48 mothers with at least one infant aged between 12-24 months. 16=lower class Anglo mothers 16=middle class Anglo mothers 16=Puerto-Rican mothers, resident in mainland USA. Part 2, fresh recruitment. N=48 mothers	Part 1 Coding of concepts. Inferential statistics. Part 2 Coding of concepts Inferential statistics.	Anglo mothers focused on characteristic/behaviour associated with individual autonomy. Puerto Rican mothers focused on behaviour/characteristic associated with respectfulness.	83% Further information regarding study design required. No mention of sample size calculation.

	behaviour were compared using the vignettes and descriptors generated on the basis of mothers' responses in Study 1':823.		with at least one infant between 12-24 months. 16=lower class Anglo mothers 16=middle class Anglo mothers 16-Puerto-Rican mothers, resident in mainland USA.			
HARWOOD et al. (1996) 'Culture and class influences on Anglo and Puerto Rican mothers' beliefs regarding long-term.'	'To examine cultural differences in parental beliefs regarding desirable and undesirable long term socialization goals and child behaviour; to attempt to disentangle the role played by culture and socioeconomic status as simultaneous sources for group differences in parental beliefs; to demonstrate that certain cultural constructs are central enough within each national culture to elicit general agreement and to manifest a broad level of shared discourse, despite within group variability': 2447	Quantitative. Part 1: cross sectional. Data collected using semi structured interview of four open ended questions. Part 2: cross sectional. Data collected using semi structured interview. Closed and open questions.	Part 1 N=100 mothers with infant aged between 12-24 months 20= middle class island Puerto Rican 20=island lower class Puerto Rican 20=middle class Puerto Rican Island 20=lower class Anglo American 20=middle class Anglo American 20=migrant lower class Puerto Rican Part 2 N=40 mothers with infant aged 12-24 months. 20=middle class Anglo American	Part 1: Coding of interview data. Inferential statistics. Part 2: Coding of interview data. Inferential statistics.	Part 1: Culture and socioeconomic status contribute independently towards beliefs about long- term socialisation goals for children. Culture associated more strongly with long -term socialisation goals for children. 'Proper Demeanour' the most commonly used ideal for all three groups of Puerto Rican mothers, whereas Anglo mothers described goals for their children that characterised 'Self Maximization.' Part 2: supports study 1. Anglo and Puerto Rican mothers place different values upon 'Self Maximization' and 'Proper Demeanour' even when SES controlled for.	80% No estimate of power size of sample.

	<p>parental beliefs regarding desirable and undesirable long-term socialisation goals and child behaviour':2448).</p> <p>Part 2: purpose 'to examine closely cultural differences in mothers' beliefs regarding desirable and undesirable child behaviour among middle-class Anglo and middle-class Puerto Rican mothers': 2456</p>		<p>20=middle class Puerto Rican island resident</p>			
<p>HUANG et al. (2005) 'Maternal Knowledge of Child Development and Quality of Parenting among White, African-American and Hispanic Mothers.'</p> <p>USA</p>	<p>'We sought to resolve some of the limitations in the literature and further investigate whether the association between maternal knowledge and parenting varies with race/ethnicity. Specifically, maternal knowledge was defined as maternal knowledge of developmental norms and milestones' :152</p>	<p>Longitudinal quantitative. Video observation, structured interview, questionnaire.</p> <p>Families surveyed when infants aged 2-4 months, and 16-18 months.</p>	<p>Recruited from a larger study of 5565 families. 658 families eligible to join study.</p> <p>N=378 families</p>	<p>Inferential statistics</p>	<p>56% = correct maternal estimate of child's development. White and Hispanic mothers had higher levels of child development knowledge than African-American mothers. Maternal age, wealth, education, depression levels, and marital status associated with levels of child development knowledge. For example, lower levels of education associated with negative impact upon maternal knowledge of child development.</p> <p>Knowledge of child development not associated with measures of parenting behaviours. However, lower levels of child development related to less sensitive interaction with child during a parent/child teaching situation.</p>	<p>100%</p>

					Maternal race/ethnicity associated with parenting behaviours.	
JESSEE et al. (2016) 'Maternal supportive behavior, cognitive talk, and desire/emotion talk at 24 months: distinct factors and differential antecedents.' USA	'Mental-state talk is an important parenting construct, yet it is not clear whether mental-state talk is distinct from other aspects of maternal behaviour, such as sensitivity and cognitive stimulation, or whether it coheres across different types of mental states (i.e. cognition, desire, emotion). The current investigation aimed to address these gaps' : 63.	Longitudinal quantitative. Questionnaire, video observation. Mothers surveyed when infant aged 1 and 6 months. Video observation at 24 months.	Recruited from a larger study of 1364 children and families. 1114 families for whom data was available on maternal mental-state talk were included. N=1114 families.	Inferential statistics.	Confirmatory factor analysis demonstrates that mothering behaviours of supportive behaviour, cognitive mental state talk and desire/emotional state talk are distinct from each other. Higher levels of maternal depressive symptoms at 1 and 6 months were significantly associated with lower levels of supportive behaviour at 24 months. Mothers that reported progressive rather than traditional parenting beliefs at 1 month had higher levels of supportive behaviour and cognitive state and desire emotional state talk.	83% Further clarification regarding sample required.
KELLER et al. (2003) 'Warmth and contingency and their relationship to maternal attitudes toward parenting.' Germany	'We assessed the relationship between behavioural measures of maternal sensitivity, warmth, and contingency toward positive and negative signals of 3 month old babies and self reported maternal attitudes':277	Quantitative. Cross sectional. Questionnaire, video observation.	60 mothers and infants aged 3 months.	Video data coded for components of parental behaviour. Inferential statistics.	Maternal sensitivity associated with maternal response to infant cues (contingency). Maternal sensitivity not associated with maternal warmth. Warmth and contingency not associated with maternal attitudes towards parenting.	80% Study design not immediately clear. Require further information relating to choice of sample and development of Likert Scale.
KURTH et al. (2014) 'Responding to a crying infant - You do not learn it.' Switzerland	'To better understand processes underlying first time and experience mothers' responses to infant crying and their comforting practices during the first 12 weeks post	Longitudinal qualitative. Data were collected at 6-8 and 12-14 weeks postpartum. Interpretive phenomenology, using	15 mothers and infants. Infants aged 6-8 weeks onwards.	Case analysis. Thematic analysis exemplars.	With experience first time mothers perceived reasons/patterns to crying and used this information to manage their soothing techniques and personal stress.	80% Diversity of sample attempted, but sample includes mostly nurses. ? participant review of transcript.

	birth' :743).	participant observation and interviews.				Reflexivity partial.
MILLER and HARWOOD (2002) 'The cultural organization of parenting: change and stability of behavior patterns during feeding and social play across the first year of life.'	'How cultural structuring of mother-infant interactions during everyday contexts such as feeding and social play changes during the first year of life, or the ways in which such changes may represent universal versus group-specific influences':245	Longitudinal quantitative. Data were collected when infants were 4, 8 and 12 months of age. Structured interview, video observation.	N=60 mothers and infants. 32 Anglo-American mothers and infants. 28 Puerto Rican mothers and infants.	Inferential statistics.	In identifying socialisation goals Anglo mothers perceived self - maximization to be important and their interactions with infants reflected this. Puerto-Rican mothers perceived placed more emphasis proper demeanour than self -maximization, interactions with infants emphasised interdependence of the infant upon the mother.	81% Study design not explicitly stated. Sample recruited via invitation.
USA mainland Puerto Rica						
MOSCARDINO et al. (2006) 'Cultural beliefs and practices related to infant health and development among Nigerian immigrant mothers in Italy.'	'To explore childrearing beliefs and practices among migrated Nigerian mothers of infants': 245	Qualitative. Ethnography. Data were collected using semi structured interviews.	N=29 first generation immigrant Nigerian mothers and infants aged 2-12 months	Thematic analysis	Developmental goals linked with independence and learning the Italian culture. Health care practices linked to psychological and physical characteristics of child. Emphasis upon prolonged physical contact between mother and baby important. For example, co-sleeping until age 3-8 years.	85% Further information on how sample recruited. Appears to lack participant observation, however authors integrated to local community.
Italy						
SEO (2006) 'A Study of Infant Developmental Outcome with a Sample of Korean Working Mothers of Infants in Poverty:	'This study was designed to replicate the research design and methodology employed in a Conrad et al. (1992) study using a sample of Korean working mothers living in high-risk environments':254. The	Quantitative. Cross sectional. Questionnaires. Structured interview. observation.	N= 42 mothers with infants aged 0-12 months. Recruited from a larger study N= 92 mother-infant pairs.	Inferential statistics.	Greater knowledge of infant development associated with more stimulating home environments, and infants with a higher level of development than mothers with a lower knowledge of infant development.	80% Clarification required relating to study design and how sample recruited. Sample size seems small, no power calculation provided.

Implications for Early Intervention Program.'	following questions were asked: 'Are there both main and interaction effects between maternal knowledge and maternal self- efficacy on parenting behaviour?' 'What are the predictors of infant developmental outcome?':254				Mothers with the most knowledge of infant behaviour showed better parenting behaviour. Maternal knowledge of infant development only significant predictor of infant development outcome. Although result not significant – higher maternal self -efficacy in terms of parenting resulted in lower scores of maternal knowledge of infant development, and infants with lower developmental scores.	
Korea						
STOIBER and HOUGHTON (1993) 'The relationship of adolescent mothers' expectations, knowledge, and beliefs to their young children's coping behavior.'	'Explores the consequences of a specific category of cognitions-parental constructs that are considered to mediate the child-rearing system experienced by young children':64	Quantitative. Cross sectional. Questionnaires. Video observation.	N=40 mothers with infants aged 4 to 22 months.	Inferential statistics	Mothers who had more positive expectations for their own and their children's behaviour and emotions had children whose had more adaptive and effective sensorimotor and reactive behaviour coping; knowledge of child development and child rearing beliefs did not predict this. Interaction of maternal knowledge and child rearing beliefs and child's self- initiated coping behaviour. Higher levels of knowledge of child development and inflexible child rearing beliefs linked to the lowest level of self – initiated coping behaviour.	86% Clarity required regarding study design. No power calculation for sample size.
USA						
TURNER et al. (2008) 'The relationship of	'The relationships between maternal mentalization and executive functioning	Quantitative. Cross sectional. Questionnaires and	N=64 mothers with infants aged between 3-48	Inferential statistics.	Almost significant relationship found between mothers' ability to attribute and the ability to	90%

maternal mentalization and executive functioning to maternal recognition of infant cues and bonding.'	abilities and the recognition of emotion cues in infants and bonding in a non- clinical sample':501	assessment tools.	weeks.		recognise infant expressions. This suggests association between mentalization and being able to perceive infant emotions :509.	
UK						

Table 1. Summary of studies included in systematic review